

Financial fitness

A Simple Quiz To Understand The Arithmetic Of Losing

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You need to understand this powerful mathematical truth: A large percentage loss is more damaging to a portfolio than an equal percentage gain is helpful. That's a mouthful, so let me show you what I mean.

Try this simple finance question. If you made 101% in Period 1 and then lost 57% in Period 2, how much profit have you made over the two periods?

The Quick math would say you made a 44% profit. After all, $101\% - 57\% = 44\%$.



Unfortunately, the quick math is wrong and very misleading. This is not a subtraction problem. It's really a multiplication problem. The Right math is:

$$\begin{aligned} &(1.00 + \text{Period 1 gain}) \times (1.00 + \text{Period 2 gain}) - 1.00 \\ &= (1.00 + 1.01) \times (1.00 - 0.57) - 1.00 \\ &= 2.01 \times 0.43 - 1.00 \\ &= 0.86 - 1.00 \\ &= -0.14 \end{aligned}$$

Wasn't that fun! That last entry of "- 0.14" means that this investment actually lost 14%!

It's easier to see this with some money. Let's say you start Period 1 with \$100. During that period you made 101%, which means you made \$101 dollars profit on top of your \$100 starting balance. So you now have \$201.

In Period 2, you lost 57%. In other words, at the end of Period 2, you have 43% of what you started Period 2 with. What's 43% of \$201? \$86.

Overall, then, after subtracting off the \$100 you started with, you've lost \$14. Or 14%. That's a far cry from a 44% gain!

Here's the key point that many people miss: In Period 2, you didn't just lose 57% of your original \$100. That would have been a \$57 loss. The fact is, you lost 57% of the appreciated \$201. That's much bigger than a \$57 loss. It's a \$115 loss.

Would the results have been any different if the order were reversed – in other words, if you lost the 57% in Period 1 and then gained 101% in Period 2? No. Remembering back to algebra, “multiplication is commutative.” Translation: you can reverse the order in a multiplication problem and it still will yield the same answer. Using our \$100 example, if you started with \$100 and lost 57% of it in Period 1, you’d be left with only \$43. Then, in Period 2, you did just a little better than doubling it (i.e. gaining 101%), so your \$43 becomes \$86. Same result as before.

Let me pose my finance question another way. How much would you have to gain in Period 2 to break even after losing 57% in Period 1? We know it’s more than 101% – that only got us back to a 14% loss. Answer: 133%. Re-using our \$100 example, at the end of Period 1, you’ve lost 57% of the \$100, so you’re down to \$43. You need to make \$57 in Period 2 to get back to the \$100 break-even mark. $\$57 / \$43 = 1.33 = 133\%$.

In fact, here’s a sampling of Period 1 losses along with the Period 2 gains it would take to break even. Let’s see if you notice a pattern:

Period 1 Loss	Gain Needed to Break-Even
10%	11%
20%	25%
30%	43%
40%	67%
50%	100%
60%	150%
70%	233%

As the Period 1 loss rises, the amount needed to breakeven rises even quicker.

Bottom line: The Arithmetic of Losing is irrefutable. Avoid large losses.

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